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## Managing Herbicide Resistance: Listening to the Perspectives of the Practitioners

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# Managing Herbicide Resistance: Listening to the Perspectives of the Practitioners.

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David Shaw, Mike Barrett, David Ervin, Amy Asmus, Ray Jussaume, Harold  
Coble

The Listening Session Regional Coordinators and HR Education Committee  
Members

A little history of our efforts -



# Herbicide Resistance Summit I 2012

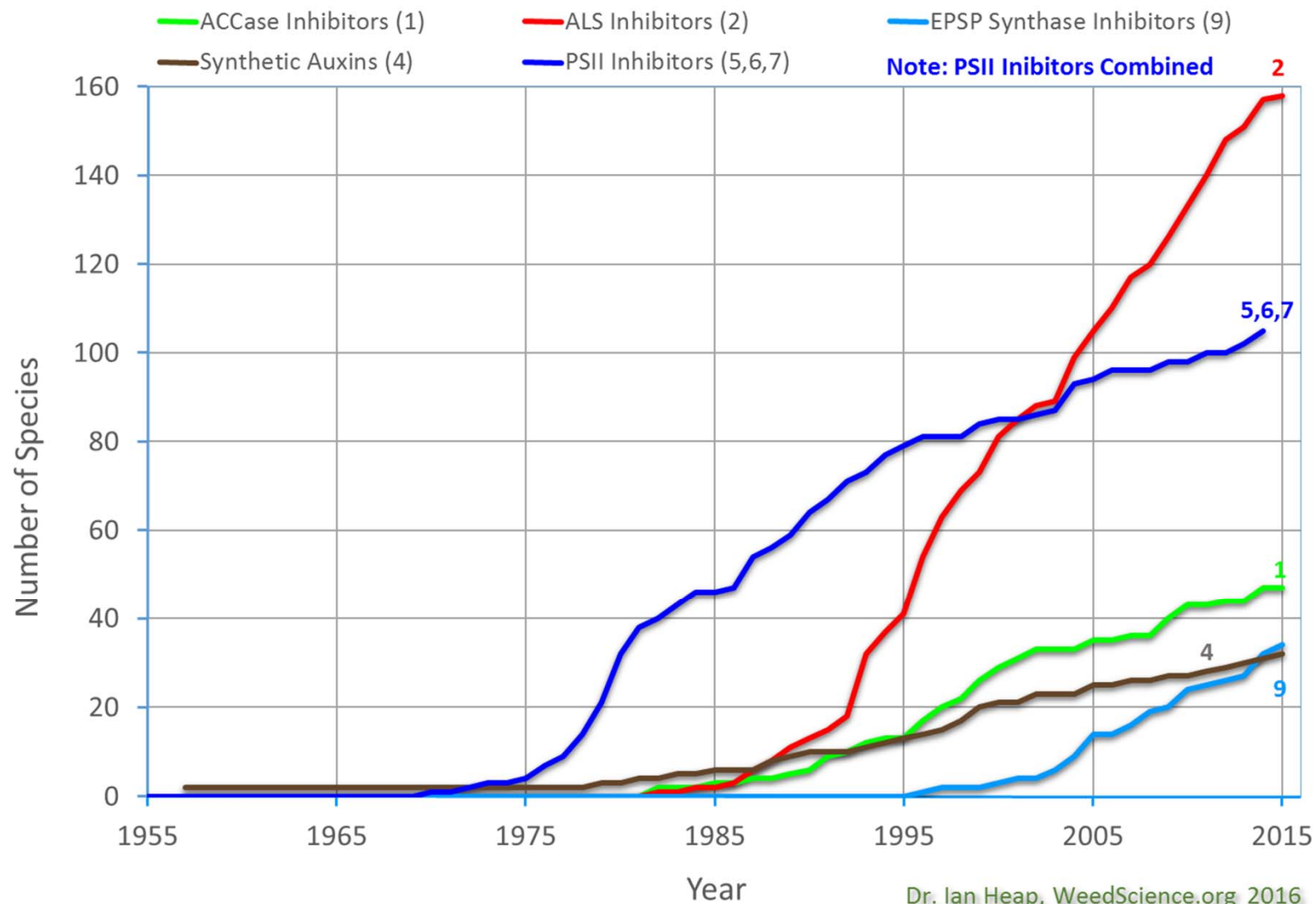
sponsored by the National Research Council (NAS)

- ▶ Goal
  - ▶ Catalyze action
  - ▶ Foster collaboration
- ▶ Summarized two publications on resistance
  - ▶ Herbicide Resistance: Toward an Understanding of Resistance Development and the Impact of Herbicide-Resistant Crops. Vencill et al. 2012. WS 60 SP1
  - ▶ Reducing the Risks of Herbicide Resistance: Best Management Practices and Recommendations. Norsworthy et al. 2012. WS 60 SP1
- ▶ Explored scientific basis of herbicide resistance
- ▶ Considered perspectives on ways to overcome herbicide resistance
  - ▶ Best Management Practices
  - ▶ Opportunities
  - ▶ Barriers

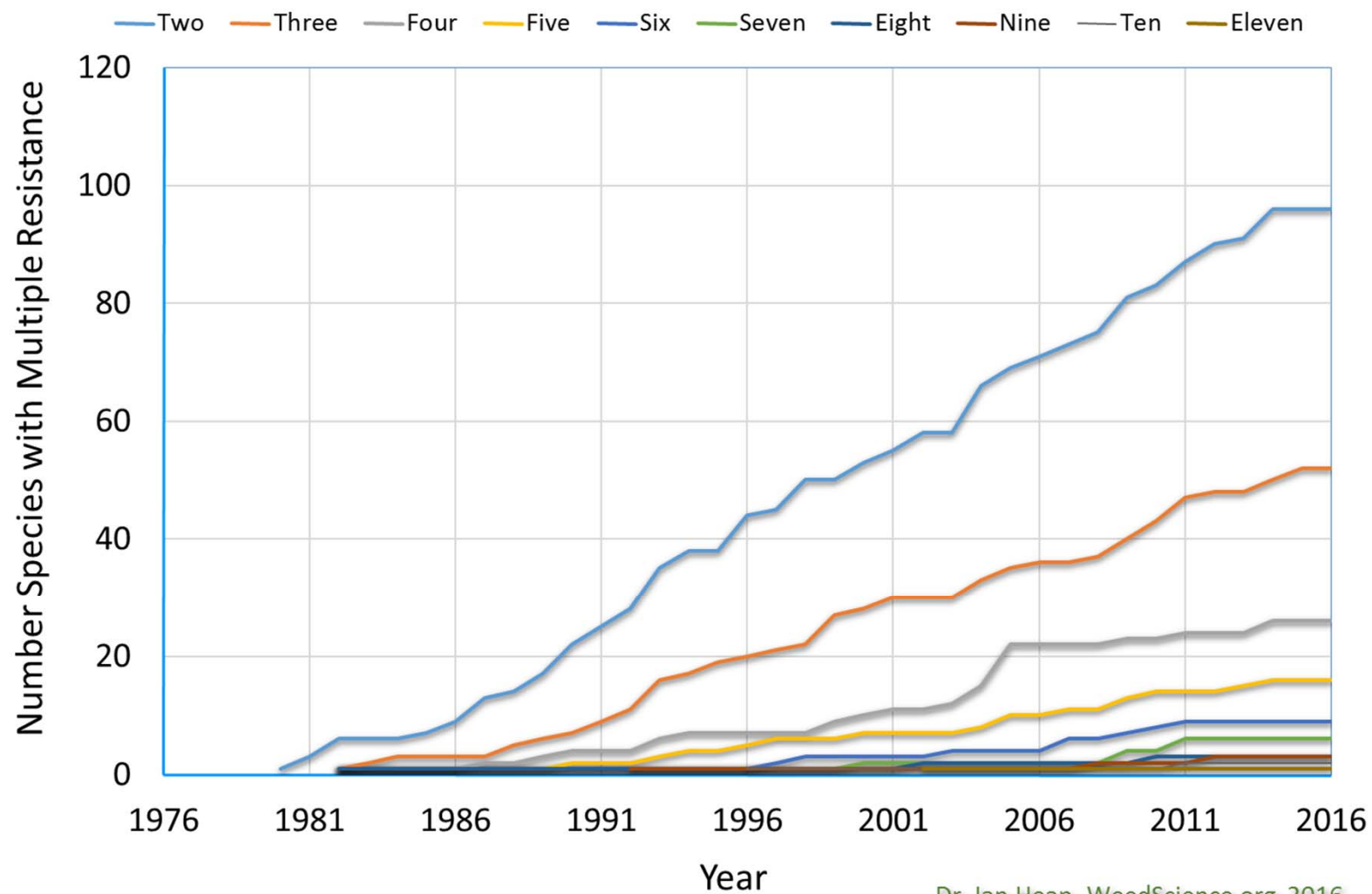
<http://nas-sites.org/hr-weeds-summit/>

2<sup>nd</sup> National Summit on Strategies to Manage Herbicide-Resistant  
Weeds September 10, 2014

## Number Resistant Species for Several Herbicide Sites of Action (WSSA Codes)



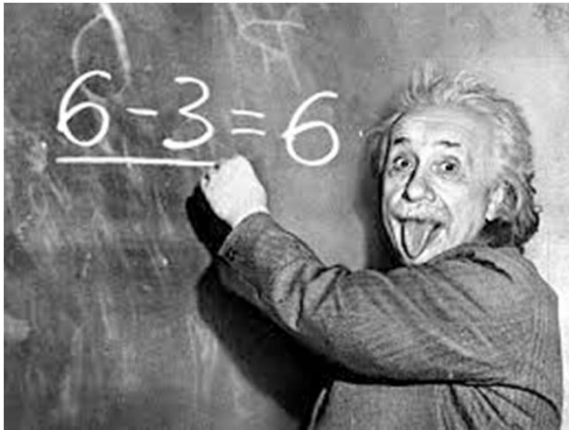
## Weed Species with Resistance to More than One Site of Action



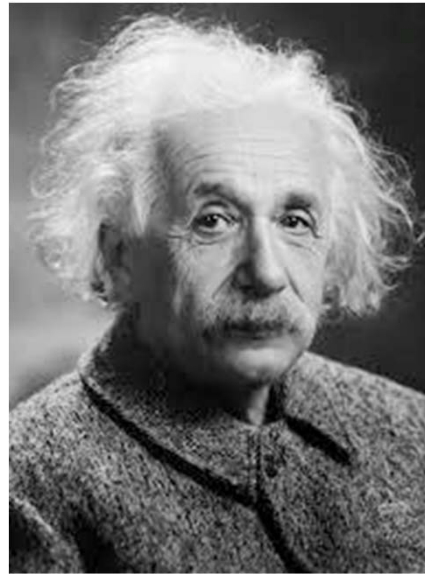
Dr. Ian Heap, WeedScience.org 2016

# Insanity....

*Doing the same thing over and over again and expecting a different result.*



Albert Einstein





# Herbicide Resistance Evolution

- ▶ A biology problem
- ▶ A technology problem
- ▶ A **HUMAN** problem

“Sole reliance on education, technical assistance, and other incentives aimed at changing individual grower behavior likely will fail to stem the advance of HR.”

Ervin and Jussaume. 2014. Integrating Social Science into Managing Herbicide-Resistant Weeds and Associated Environmental Impacts. *Weed Science* 62(2):403-414.

## What we do Next?

- ▶ We either have to do something “different” or accept that we are insane.
- ▶ The human dimension *MUST* come into play, and be integrated with biology, to guide strategies from here forward.
- ▶ Considerations from a social science standpoint.

# National Summit II: Strategies to Manage Herbicide-Resistant Weeds

September 2014

- ▶ Understanding the socio-economic dimensions of the problem
- ▶ Moving to more systems-based solutions
- ▶ Re-evaluate what we have been doing that has NOT worked
- ▶ Every group has a role to play!

# Horror beyond Understanding!

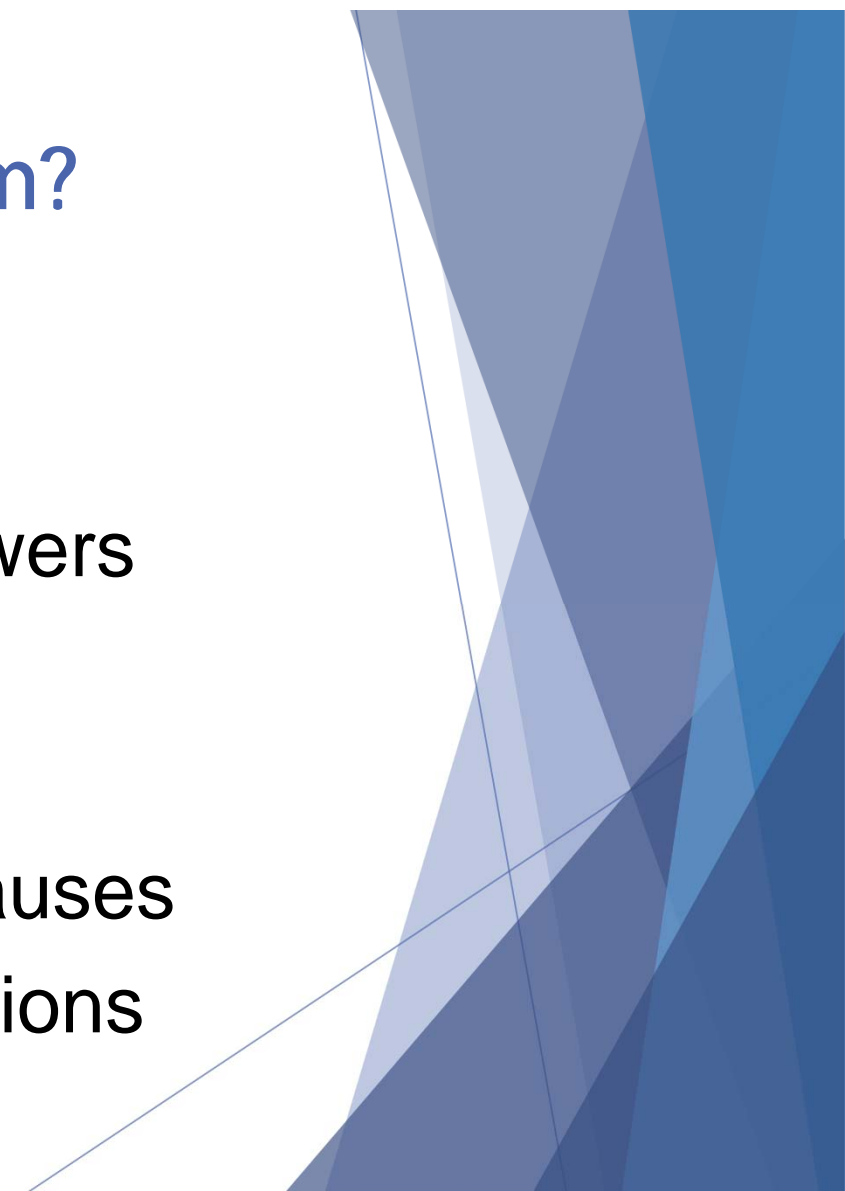


## Attack of the Wicked Problem!

### Undefinable! Unknowable! Unstoppable!

# What is a “Wicked” Problem?

- No definitive formulation
- No final solution
- No true/false or good/bad answers
- No definitive solution set
- Every wicked problem unique
- Multiple potential and viable causes
- Intolerance for ineffective solutions



## What next to address the Wicked Problem?

- ▶ Seven regional listening sessions were held to bring in perspectives on herbicide resistance from different geographies and cropping systems.
  - ▶ Improve understanding of who are the stakeholders.
  - ▶ Improve understanding of regional diversity regarding issues and solutions.
  - ▶ Identification of stakeholder wants and needs.
  - ▶ Identification of needed next steps by organizers.

Listening Sessions Funded by: USDA-APHIS, USB, WSSA

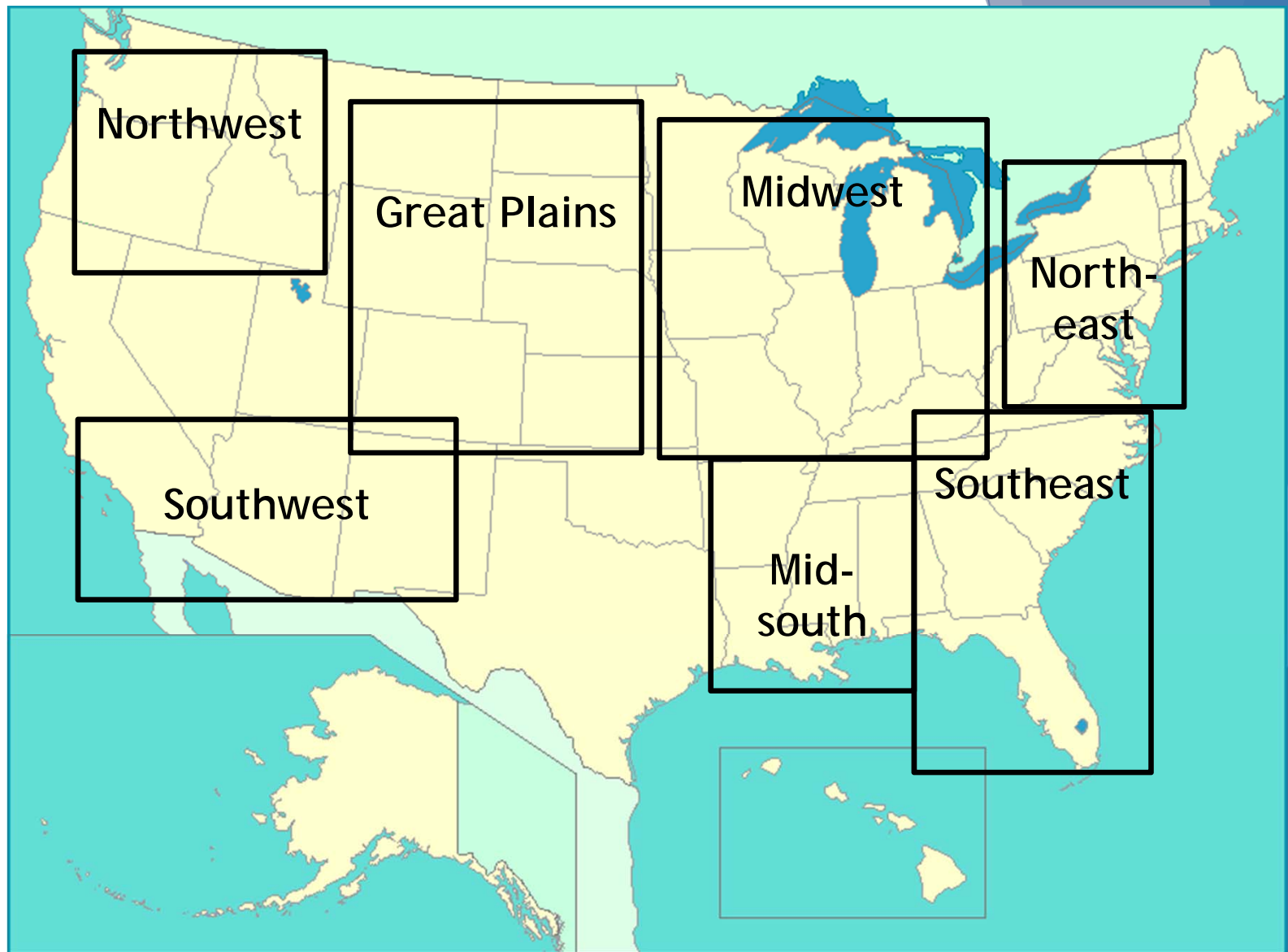


# Why Listening Sessions?

- ▶ We told everyone what they needed to do - and the problem continues to increase!!!!
  - ▶ We still do not fully understand the nature of the problem - why aren't things changing?
- ▶ Until you truly understand the problem, you can't find solutions.



# Regions selected for the Listening Sessions





Region/States	Date/Location	Coordinators
<u>MidSouth</u> MO, TN, AR, MS, LA	December 5, 2016 Starkville, MS	Darrin Dodds (MSU) Larry Steckel (UTN)
<u>Northeast</u> PA, MD, DE, NY, VA, WV	January 18, 2017 Lancaster, PA	Bill Curran (PSU) Mark VanGessel (UMD) Annie Klodd (PSU)
<u>Northwest</u> WA, OR, ID, MT, UT, NV	January 24, 2017 Pasco, WA	Ian Burke (WSU) Don Morishita (UID)
<u>Southwest</u> CA, AR, NM	February 15, 2017 Tulare, CA	Brad Hanson (UC - Davis) Brian Schutte (NMSU)
<u>Great Plains</u> KS, NE, CO, WY, MT	February 17, 2017 Holyoke, CO	Phil Stahlman (KSU) Todd Gaines (CSU) Andrew Kniss (UWY) Cody Creech (UNB) Prashant Jha (MSU) Sandra McDonald (Mountain West PEST)
<u>Midwest</u> IA, IL, IN, KS, KY, MI, MN, MO, NC,ND, NE, OH, SD, TN and WI	March 4, 2017 San Antonio, TX	Christy Sprague (MSU) Jeff Gunsolus (UMN)
<u>Southeast</u> GA, FL, NC, SC, AL	March 30, 2017 Waynesboro, GA	Ramon Leon (UFL) Stanley Culpepper (UGA)

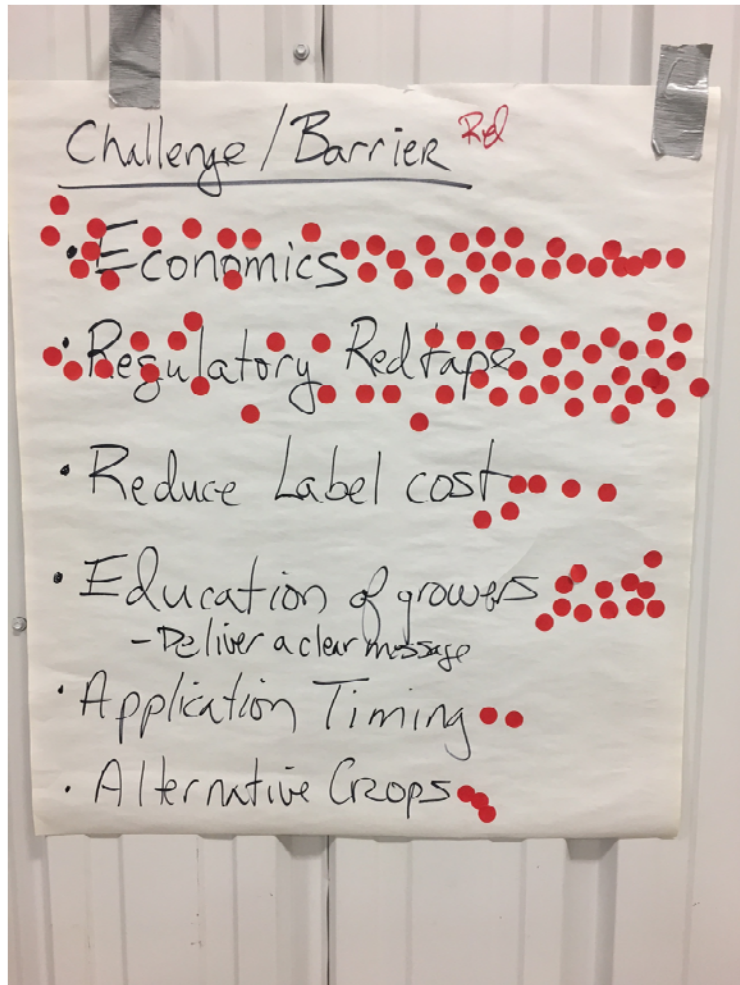
# Participants

- ▶ Method of developing invitation list varied by region
  - ▶ Based on regional characteristics, location, other events, demographics
- ▶ Number of attendees varied from 40 to nearly 180 individuals.
- ▶ Participants represented the region's agricultural sector primarily
  - ▶ Growers
  - ▶ Consultants
  - ▶ Retailers
  - ▶ Extension
  - ▶ Other groups included private industry, state/county agencies, DOT, commodity and farm organizations, BLM....

# Listening Sessions Agenda

- ▶ Facilitated meeting (Strategic Conservation Solutions, LLC)
- ▶ Agenda
  - ▶ Setting the stage with stakeholder perspectives
  - ▶ Table discussion of personal perspectives regarding HR
    - ▶ Defining level of concern about HR
    - ▶ Level of concern about spread of HR weeds
    - ▶ Describing the challenge of HR
  - ▶ Table discussion about managing HR
    - ▶ Challenges and barriers
    - ▶ Experiences and successes
    - ▶ Wants and needs
  - ▶ New perspectives and recommendations

# Information obtained from each listening session



- ▶ Table notes from discussions
  - ▶ Individual participant notes
  - ▶ Table host summary notes
- ▶ Participant evaluations
- ▶ WSSA committee notes of report outs
- ▶ Flip chart notes from report outs
- ▶ Recordings of report outs
  - ▶ Only for verification

What did we learn?



# Messages we heard in the Listening Sessions

## ► *Theme 1: We need new herbicides and new herbicide MOAs*

*[Why adopt resistance-management practices if you believe new herbicides will soon be available?]*

- Regulatory red tape
- Cost/time to register

## Messages we heard:

- ▶ *Theme 2:* There is no need for more regulation!

*[Can the threat of regulation motivate changes in behavior?]*

- ▶ Regulation was perceived as a barrier to new technologies.
- ▶ NE was the only region that indicated that regulation could be part of the solution.
  - ▶ Concern for Palmer amaranth invasion

## Messages we heard:

- ▶ *Theme 3: There is a need for more education - especially for “others”*

*[Non-chemical management approaches are under-supplied by the private sector]*

BM1

- ▶ Clarification needed: “old/new” chemistry registered on a new crop vs a new MOA.
- ▶ Education about herbicides vs non-chemical methods
  - ▶ How to incorporate both into production system
- ▶ Need for more communication and collaboration between ALL stakeholders
  - ▶ Consistent messaging



## Slide 22

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**BM1** Barrett, Michael, 11/19/2017

**BM [2]1** Jill - should we add a comment about education for "others"  
Barrett, Michael, 11/19/2017

## Messages we heard:

### ► *Theme 4: Diversity is hard*

*[New herbicides fit more easily in current agricultural structure - but growers have been known to make needed changes]*

- Growers expressed concern about the lack of profitable alternative crops and/or challenges in using cover crops
  - Economics
  - Equipment needs
  - Conservation program requirements
- Immediacy of issue influences response to educational efforts.

## Messages we heard:

- ▶ **Theme 5: The current agricultural economy makes it difficult to do things differently**

*[Farmers are tempted to delay adoption of HR costs]*

BM [3]1

- ▶ Lack of affordable financing
  - ▶ Low commodity prices
- ▶ Lack of understanding of long term economic impacts of HR and HRM.
- ▶ Land ownership
- ▶ Resource availability
- ▶ Need for incentives
- ▶ Economics of diversification of practices
- ▶ Economics may guide research directions

## Slide 24

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**BM [3]1** Jill - I think it is important to relay that even though this was said, the truth is farmers were not changing practices even when crop prices were very good

Barrett, Michael, 11/19/2017

## Messages we heard:

- ▶ **Theme 6:** We are aware of HR but are managing it and we are not in a panic.

*[If they believe that a new herbicide is coming, they will be less likely to be concerned.]*

BM [4]1

- ▶ The attitude appears to be different between farmers and weed scientists.
  - ▶ 95% agreed that HR is a problem
  - ▶ 95% agreed that spreading HR weeds from field to field is a problem.
  - ▶ 80% concerned about county to county or region to region spread.
- ▶ Concern was raised about the possibility of multiple resistance or resistance to alternative herbicides.

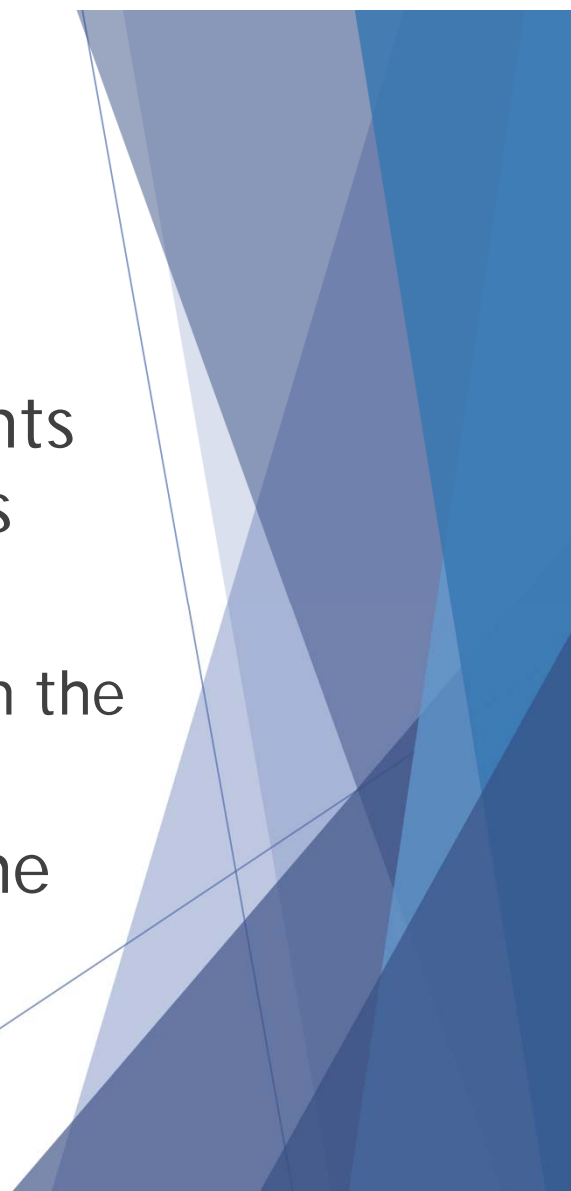
## Slide 25

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**BM [4]1** The comment/question I would raise here is whether we have reached a panic tipping point - that the attitude and concern may be very different between growers and weed scientists  
Barrett, Michael, 11/19/2017

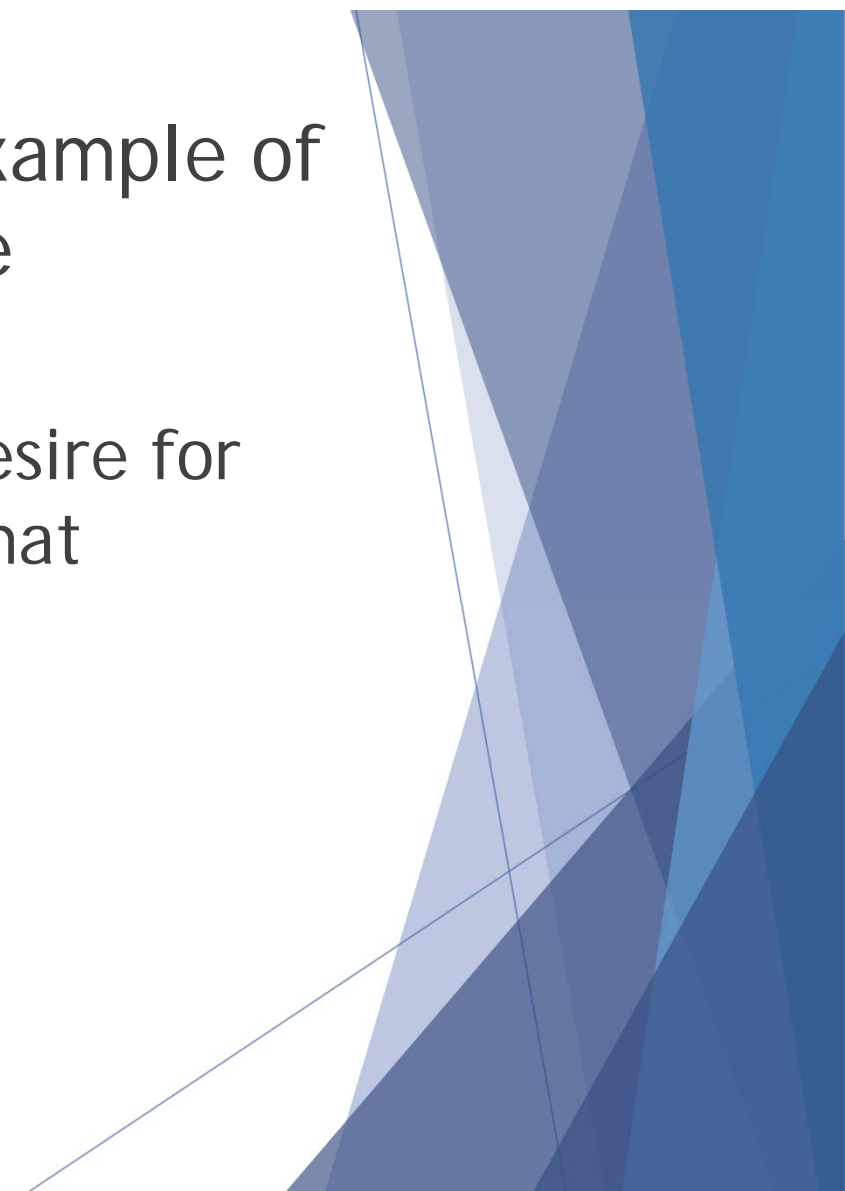
What have we achieved?



- 
- ▶ We gained ground level intelligence on HR conditions
  - ▶ We have a framework of stakeholders from producers, industry reps. to regulatory agents and from weed scientists to social scientists who are now working together on HR
    - ▶ Recognition of HR as a problem is widespread in the agricultural community in the U.S.
  - ▶ Weed Scientists have begun to talk about the human dimension of HR



- ▶ The listening sessions are an example of a different approach to provide outreach
  - ▶ Many participants expressed a desire for more sessions with a similar format



What needs to be done next?



# So what is next? - Questions for your consideration.....

- ▶ Do we truly understand how hard it is for farmers to do what we are suggesting they do????
  - ▶ Weed control is but one business and management decision that farmers must make each year.
- ▶ What do we need to do to understand and address weed management within the larger context of the farming operation?

# So what is next? - Questions for your consideration.....

- ▶ To me --- the federal bureaucrat
  - ▶ What do I need to know to start conversations within federal agencies?
    - ▶ Are there federal or other government programs/policies that make it difficult to adopt BMPs?

# So what is next? - Questions for your consideration.....

- ▶ To NCWSS - the professional society
  - ▶ Do you facilitate communication between all groups within the north central region?
    - ▶ Is the message consistent and clear?
  - ▶ Do you work together across the region and with other regions?
  - ▶ What do national groups need to know about HRM in the north central?

# So what is next? - Questions for your consideration.....

- ▶ To the research/extension community
  - ▶ How will you address the fact that the HR listening session participants think there will be new MOA?
  - ▶ Take Action materials have great information on MOA and other HR strategies:
    - ▶ How are they being used?
    - ▶ Do growers/advisers have the science based information they need to successfully and profitably diversify their operations?

# So what is next? - Questions for your consideration.....

- ▶ To the research/extension community
  - ▶ We heard in the mid-west session that corn/soybean producers do not have profitable rotations.
    - ▶ What research is going on that addresses rotations and how they fit into a complete production system?
    - ▶ Do you have the economic information they need to make the changes you suggest?
  - ▶ How do we address the issue of seed movement more effectively/efficiently?

# So what is next? - Questions for your consideration.....

- ▶ To the advisers
  - ▶ How are you using the Take Action materials?
    - ▶ Is your messaging consistent?
    - ▶ Are you remaining current?
    - ▶ Are you impartial?
  - ▶ What do you need from research/extension to provide science based information on diversification of practices to your farmers?



# So what is next? - Questions for your consideration.....

## ▶ To the Industry

- ▶ How are you using the Take Action materials?
  - ▶ Is your messaging consistent with others?
  - ▶ Are you impartial?
- ▶ Why do farmers think a new MOA is coming?
- ▶ How is your technology integrated with other weed management tools to reduce selection pressure on weed populations?

# An invitation to join the discussion -

- ▶ NCWSS is an excellent forum to coordinate this needed discussion.
- ▶ NCWSS can facilitate discussions with
  - ▶ Members
  - ▶ Other regional societies
  - ▶ WSSA
  - ▶ Government agencies - both state and federal

# An invitation to join the discussion -

- ▶ WSSA annual meeting January 28-February 1
  - ▶ Arlington, VA (Crystal Gateway Marriott)
- ▶ February 1 - symposium “Learning by Listening: Herbicide Resistance Listening Sessions”
  - ▶ Panel discussions by representative stakeholders and by regional coordinators
- ▶ **PLEASE JOIN THE DISCUSSION**

COMMENTS? QUESTIONS?

Thank you

